# Theory on Non-linguistic Representations

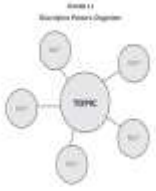
Many psychologists adhere to what has been called the "dual-coding" theory of information storage (see Paivio, 1969, 1971,1990). This theory postulates that knowledge is stored in two forms—a linguistic form and an imagery form. The linguistic mode is semantic in nature. As a metaphor, one might think of the linguistic mode as containing actual statements in long-term memory. The imagery mode, in contrast, is

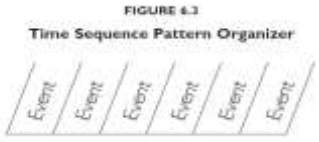
expressed as mental pictures or even physical sensations, such as smell, taste, touch, kinesthetic association, and sound (Richardson, 1983). In this book, the imagery mode of representation is referred to as a *nonlinguistic representation.* The more we use both systems of representation—linguistic and on linguistic—the better we are able to think about and recall knowledge.

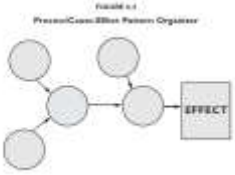
**Nonlinguistic representations should elaborate on knowledge.**

## Creating Graphic Organizers

**Descriptive Patterns. Time Patterns –Sequence Process /Cause-Effect Patterns**

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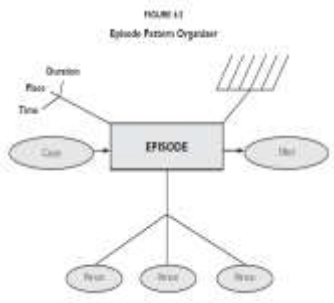
**Time sequence patterns** organize events in a specific chronological order. For example, information about the development of the Apollo space program can be organized as a sequence pattern. Figure 6.3 shows how you might represent a time-sequence pattern graphically.

**Process/cause-effect patterns** organize information into a causal network leading to a specific outcome or into a sequence of steps leading to a specific product. For example, information about the factors that typically lead to the development of a healthy body might be organized as a process/cause-effect pattern. Figure 6.4 shows a graphic representation of a process/cause-effect pattern.

**Episode Patterns.** Episode patterns organize information about specific events, including (1) a setting (time and place),(2) specific people, (3) a specific duration,(4) a specific sequence of events, and (5) a
particular cause and effect. For example, students might organize information about the French Revolution into an episode pattern using a graphic like that shown in Figure 6.5.

**Episode Patterns.**




**Generalization / Principle Patterns.**

Generalization/principle patterns organize information into general statements with supporting examples. For instance, for the statement, "A mathematics function is a relationship where the value of one variable depends on the value of another variable," students can provide and represent examples in a graphic like that shown in Figure 6.6.

**Generalization / Principle Patterns** **Concept Patterns.**

FIGURE 6.6
Generalization/Principle Pattern Organizer

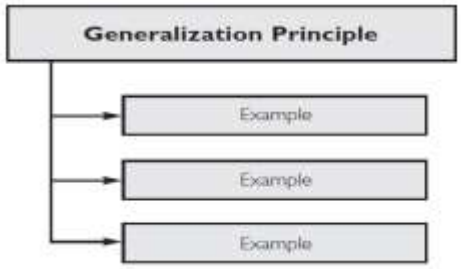
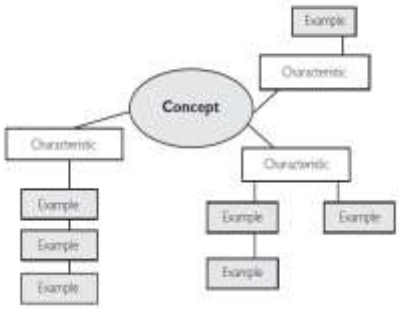



FIGURE 6.7
Concept Pattern Organizer




**Concept Patterns.** Concept patterns, the most general of all patterns, organize information around a word or phrase that represents entire classes or categories of persons, places, things, and events. The characteristics or attributes of the concept, along with examples of each, should be included in this pattern. For example, students could use a graphic like the one in Figure 6.7 to organize the concept of *fables*, along with examples and characteristics.

# Using Other Nonlinguistic Representations

**Making Physical Models.** As the name implies, physical models are concrete representations
of the knowledge that is being learned. Mathematics and science teachers commonly refer to the use of concrete representations as "manipulatives." The very act of generating a concrete representation
establishes an "image" of the knowledge in students' minds. The following example illustrates this process in the context of a science class.

**Generating Mental Pictures.** The most direct way to generate nonlinguistic representations is to simply construct (i.e., imagine) a mental picture of knowledge being learned. For abstract content, these mental
pictures might be highly symbolic.

**Drawing Pictures and Pictographs.**
Drawing pictures or pictographs (i.e., symbolic pictures) to represent knowledge is a powerful way to generate nonlinguistic representations in the mind. For example, most students have either drawn or colored the

human skeletal system or have seen a picture of one in the classroom. Similarly, most
students have drawn or colored a representation of the solar system. A variation of a picture is the pictograph, which is a drawing that uses symbols or symbolic pictures to represent information. The following example shows how a 1st grade teacher uses symbolic pictures in a geography lesson.

**Engaging in Kinesthetic Activity.**
Kinesthetic activities are those that involve physical movement. By definition, physical movement associated with specific knowledge generates a mental image of the knowledge in the mind of the learner. (Recall from the previous discussion that mental images include physical sensations.)
Most children find this both a natural and enjoyable way to express their knowledge.

Source: 'Classroom instruction that works'